AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1. (Currently Amended) A hybrid Multi-User Detector for processing raw input data comprised of a plurality of received signals, comprising:

a parameter estimation unit ~~coupled to~~ that obtains information from said received signals, at least some of said information corresponding to transmitted signals;

a high complexity multi-user detector coupled to said parameter estimation unit, wherein said high complexity multi-user detector performs a pruned tree search and outputs a plurality of information streams, one stream corresponding to each of said ~~received~~ transmitted signals;

a bank of high complexity error correction decoders coupled to said high complexity multi-user detector, ~~plurality of information streams,~~ wherein said high complexity error correction decoders output a plurality of refined information streams;

a low complexity multi-user detector coupled to said bank of high complexity error correction decoders[[,]] and said plurality of refined information streams, and said parameter estimation unit, wherein said low complexity multi-user detector outputs a plurality of improved information streams; and

a bank of ~~error correction decoders coupled to said plurality of improved information streams, wherein said error correction decoders output~~ low complexity error correction decoders coupled to said low complexity multi-user detector, wherein said bank of low complexity error correction decoders outputs a plurality of refined-improved information streams, said plurality of refined-improved information streams fed back to said low complexity multi-user detector until a final

condition is reached and said bank of low complexity error correction decoders ~~output~~ outputs a final plurality of symbol streams.

Claim 2. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, wherein said high complexity multi-user detector uses algorithms selected from at least one of the group consisting of ~~comprising~~: M-algorithm, T-algorithm, FANO, and reduced state Viterbi.

Claim 3. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, wherein at least one of said ~~error correction decoders are~~ bank of low complexity error correction decoders and said bank of high complexity error correction decoders is selected from at least one of the group consisting of ~~comprising~~: maximum a posteriori (MAP) decoders, and soft-output Viterbi algorithm (SOVA) decoders.

Claim 4. (Canceled)

Claim 5. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, further comprising ~~an interleaver~~ a deinterleaver coupled between each output stream of said high complexity multi-user detector and said bank of high complexity error correction decoders, ~~a deinterleaver~~ an interleaver coupled between each output of said bank of high complexity error correction decoders and said low complexity multi-user detector, ~~an interleaver~~ a deinterleaver coupled between each output stream of said low complexity multi-user detector and said bank of low complexity error correction decoders and ~~a deinterleaver~~ an interleaver coupled between each output of said bank of low complexity error correction decoders and said low complexity multi-user detector.

Claim 6. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, wherein said final ~~stopping point~~ condition is a fixed number of

iterations.

Claim 7. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, wherein said final ~~stopping point~~ condition is determined by an allowable performance level.

Claim 8. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, further comprising a filter unit coupled to ~~said received signals, wherein said filter unit is coupled to the said received signal, the~~ said parameter estimation unit, and said high complexity multi-user detector.

Claim 9. (Currently Amended) The hybrid Multi-User Detector according to Claim 8, wherein said filter unit is selected from at least one of the group consisting of ~~comprising~~: whitening matched filter bank, and matched filter bank.

Claim 10. (Currently Amended) The hybrid Multi-User Detector according to Claim 1, further comprising a hard decision unit coupled to said ~~low complexity~~ bank of low complexity error correction decoders and producing said final plurality of symbol streams ~~data stream~~.

Claim 11. (Currently Amended) A hybrid receiver for processing received signals comprised of a plurality of ~~received~~ transmitted signals and interfering signals in ~~a super-saturated~~ an overloaded condition, said receiver comprising:

a parameter estimation unit ~~coupled to~~ that obtains information from said received signals, wherein said parameter estimation unit extracts ~~received~~ signal information corresponding to said transmitted signals;

a front end section ~~coupled to~~ that obtains information from said received signals and is coupled to said parameter estimation unit ~~to said~~

~~received signal information~~ to produce a plurality of filtered ~~received~~ signals;

a high complexity multi-user detector coupled to said front end section ~~filtered received signals~~, wherein said high complexity multi-user detector performs a pruned tree search and outputs a plurality of information streams, one stream corresponding to each of said filtered ~~received~~ signals;

a bank of high complexity error correction decoders coupled to said high complexity multi-user detector ~~plurality of information streams~~, wherein said bank of high complexity error correction decoders ~~output~~ outputs a plurality of refined information streams;

a low complexity multi-user detector coupled to said bank of high complexity error correction decoders ~~plurality of refined information streams~~, and said parameter estimation unit ~~received signal information~~, wherein said low complexity multi-user detector outputs a plurality of improved information streams; and

a bank of low complexity error correction decoders coupled to said low complexity multi-user detector ~~plurality of improved information streams~~, wherein said bank of low complexity error correction decoders ~~output~~ outputs a plurality of refined-improved information streams, said plurality of refined-improved information streams fed back to said low complexity multi-user detector until a final condition is reached and said bank of low complexity error correction decoders output a final plurality of symbol streams.

Claim 12. (Currently Amended) The hybrid receiver according to Claim 11, wherein said high complexity multi-user detector uses algorithms selected from at least one of the group consisting of ~~comprising~~: M-algorithm, T-algorithm, FANO, and reduced state Viterbi.

Claim 13. (Currently Amended) The hybrid receiver according to Claim 11, wherein at least one of said bank of low complexity error correction decoders and said bank of high complexity error correction decoders are selected from at least one of the group consisting of ~~comprising~~: maximum a posteriori (MAP) decoders and soft-output Viterbi algorithm (SOVA) decoders.

Claim 14. (Currently Amended) The hybrid receiver according to Claim 11, wherein said low complexity multi-user detector ~~is~~ or said high complexity multi-user detector is structured for input and output processing as selected from the group consisting of: a soft decision input soft decision output, a hard decision input hard decision output, a soft decision input hard decision output, and a hard decision input soft decision output. ~~(SISO) multi-user detector that uses an algorithm selected from the group comprising: MT algorithm, MAP, Log-MAP, or Max-Log-MAP detectors.~~

Claim 15. (Currently Amended) The hybrid receiver according to Claim 11, further comprising ~~an interleaver~~ a deinterleaver coupled between said high complexity multi-user detector and said bank of high complexity error correction decoders, ~~a deinterleaver~~ an interleaver coupled between said bank of high complexity error correction decoders and said low complexity multi-user detector, ~~an interleaver~~ a deinterleaver coupled between said low complexity multi-user detector and said bank of low complexity error correction decoders and ~~a deinterleaver~~ an interleaver coupled between said bank of low complexity error correction decoders and said low complexity multi-user detector.

Claim 16. (Currently Amended) The hybrid receiver according to Claim 11, wherein said final ~~stopping point~~ condition is a fixed number of iterations.

Claim 17. (Currently Amended) The hybrid receiver according to Claim 11, wherein said final ~~stopping point~~ condition is determined by an allowable

performance level.

Claim 18. (Original) The hybrid receiver according to Claim 11, wherein said front end comprises a filter unit.

Claim 19. (Currently Amended) The hybrid receiver according to Claim 18, wherein said filter unit is selected from at least one of the group consisting of ~~comprising~~: bank of whitening matched filters ~~filter~~, and bank of matched filters ~~filter~~.

Claim 20. (Currently Amended) The hybrid receiver apparatus according to Claim 11, wherein said front end comprises a bank of matched filters, an overloaded asynchronous whitener, and a symbol-hypothesis testing section.

Claim 21. (Currently Amended) The hybrid receiver according to Claim 11, further comprising a hard decision unit coupled to said ~~low complexity~~ bank of low complexity error correction decoders and producing said final plurality of symbol streams ~~data stream~~.

Claim 22. (Currently Amended) A method for processing signals from ~~multiple users providing~~ raw digitized data from multiple users comprising:

performing parameter estimation of said raw digitized data;

computing decision tree searching path metrics from said raw digitized data using a high complexity multi-user detector in ~~the~~ a first iteration and outputting one symbol stream for each user;

decoding said one symbol stream for each user from said high complexity multi-user detector and producing a higher quality symbol stream for each user;

incorporating the information from said higher quality symbol stream into a low complexity multi-user detector and providing an improved version of ~~the~~ symbol streams, one for each user;

decoding said symbol streams output ~~by~~ from the low complexity multi-user detector ~~MUD~~;

repeating said steps of incorporating information from said improved version of symbol streams ~~stream~~ into the low complexity multi-user detector ~~MUD~~ and decoding of each symbol stream output ~~by the low complexity MUD~~ until a final state is obtained; and,

outputting a final symbol stream for each user.

Claim 23. (Currently Amended) The method for processing ~~receiver~~ signals according to claim 22, wherein said final state is determined by a fixed number of iterations.

Claim 24. (Currently Amended) The method for processing ~~receiver~~ signals according to claim 22, wherein said final state is determined by establishing an allowable difference in symbol values from ~~said~~ a last iteration value to a present iteration value.

Claim 25. (Currently Amended) The method for processing ~~receiver~~ signals according to claim 22, further comprising de-interleaving prior to said decoding by said high complexity error correction decoders and said low complexity error correction decoders and interleaving subsequent to said decoding by said high complexity error correction decoders and said low complexity error correction decoders.

Claim 26. (Currently Amended) The method for processing ~~receiver~~ signals according to claim 22, further comprising filtering ~~of~~ said raw digitized data.

Claim 27. (New) The method for processing signals according to claim 22, further comprising computing decision tree searching path metrics using said high complexity multi-user detector in at least one additional iteration.